

AMENDMENTS TO THE CLAIMS

Please amend claims 1, 3, 5-7 and 9-11 as follows:

1. (currently amended) A method of manufacturing a semiconductor device, comprising the steps of:

(a) providing a semiconductor substrate in which a floating gate electrode is formed;

(a) (b) forming a tunnel oxide film on the semiconductor substrate;

(b) (c) sequentially forming a first polysilicon film and a pad nitride film on the tunnel oxide film;

(e) (d) etching the pad nitride film, the first polysilicon film, the tunnel oxide film and the semiconductor substrate with a patterning process to form a trench in the semiconductor substrate;

(d) (e) depositing an oxide film on the entire structure including the trench and then planarizing the oxide film with the pad nitride film until the pad nitride film is exposed;

(e) (f) removing the pad nitride film and then depositing a second polysilicon film on the entire structure;

(f) (g) patterning the second polysilicon film to form the floating gate electrode;

(g) (h) nitrifying a top surface of the floating gate electrode;

(h) (i) forming a dielectric film on the entire structure including the floating gate; and

(i) (j) forming a material film for a control gate electrode on the dielectric film,

wherein the step of nitrifying the ~~top~~ top of the floating gate electrode and the step of forming the dielectric film are performed in-situ within the same chamber.

2. (original) The method as claimed in claim 1, wherein the dielectric film has an ONO structure on which a first oxide film, a nitride film and a second oxide film are sequentially stacked.

3. (currently amended) The method as claimed in claim 1, wherein the steps ~~(g)~~ (h) and ~~(h)~~ (i) that are performed in-situ within the same chamber comprise:

~~(g)~~ (h) (1) introducing a N_2O gas flow of 100 ~ 10000 sccm at a temperature of 800 ~ 950°C to nitrify the top of the floating gate electrode;

~~(h)~~ (i) (1) introducing N_2O gas and DCS (SiH_2Cl_2) gas at a pressure of 0.1 ~ 3 torr and at a temperature of 790 ~ 830°C to form a first oxide film on the entire structure;

~~(h)~~ (i) (2) introducing DCS (SiH_2Cl_2) gas and NH_3 gas at a pressure of 0.1 ~ 3 torr and at a temperature of 650 ~ 800°C to form a nitride film on the first oxide film; and

~~(h)~~ (i) (3) introducing N_2O gas and DCS (SiH_2Cl_2) gas at a pressure of 0.1 ~ 3 torr and at a temperature of 790 ~ 830°C to form a second oxide film on the nitride film.

4. (previously presented) The method as claimed in claim 3, wherein a ratio of DCS (SiH_2Cl_2) gas and N_2O gas is in the range of 1:5 ~ 1:10.

5. (currently amended) The method as claimed in claim 1, further comprising, between steps ~~(e)~~~~(a)~~ (b) and ~~(d)~~~~(b)~~ (c), the step of implementing an annealing process using N_2 at a temperature of 900 ~ 910°C for 20 ~ 30 minutes.

6. (currently amended) The method as claimed in claim 1, further comprising, between the steps ~~(g)~~ (h) and ~~(h)~~ (i), a step of implementing a steam anneal process of a wet oxidization mode at a temperature of 750 ~ 800°C so that the thickness of the dielectric film is in the range of 150 ~ 300Å.

7. (currently amended) The method as claimed in claim 1, wherein the steps ~~(g)~~ (h) and ~~(h)~~ (i) that are performed in-situ and within the same chamber and comprise:

~~(g1)~~ (h1) loading a semiconductor substrate in which a floating gate electrode is formed into a deposition chamber;

~~(g2)~~ (h2) changing the temperature within the deposition chamber to a first deposition temperature;

~~(g3)~~ (h3) nitrifying the top surface of the floating gate electrode at the first deposition temperature;

~~(h1)~~ (i1) changing the temperature within the deposition chamber to a second deposition temperature range;

~~(h2)~~ (i2) forming a dielectric film on the entire structure at the second deposition temperature range; and

~~(h3)~~ (i3) unloading the semiconductor substrate from the deposition chamber.

8. (original) The method as claimed in claim 7, wherein the first deposition temperature is 800 ~ 950°C and the second deposition temperature range is 650 ~ 830°C.

9. (currently amended) The method as claimed in claim 7, wherein the step ~~(e)~~~~(g3)~~ (h3) comprises introducing N₂O gas into the deposition chamber to nitrify the top surface of the floating gate electrode.

10. (currently amended) The method as claimed in claim 7, wherein the step ~~(h2)~~ (i2) comprises the steps of:

introducing N₂O gas and DCS (SiH₂Cl₂) gas into the deposition chamber to form a first oxide film;

introducing NH₃ gas and DCS (SiH₂Cl₂) gas into the deposition chamber to form a nitride film on the first oxide film; and

introducing N₂O gas and DCS (SiH₂Cl₂) gas into the deposition chamber to form a second oxide film on the nitride film.

11. (currently amended) The method as claimed in claim 10, wherein the ratio of DCS (~~SiH₂Cl₂~~ SiH₂Cl₂) gas and N₂O gas is in the range of ~~1:5~~ about 1:10 1:5 ~ 1:10.

12. (previously presented) A method of manufacturing a semiconductor device, comprising the steps of:

(a) forming a tunnel oxide film on the semiconductor substrate;

(b) implementing an annealing process so that a defect density at an interface between the tunnel oxide film and the semiconductor device is minimized;

(c) forming a floating gate electrode on the tunnel oxide film;

(d) nitrifying a top surface of the floating gate electrode;

(e) forming a dielectric film on the entire structure including the floating gate electrode; and

(f) forming a material film for a control gate electrode on the dielectric film, wherein the nitrifying of the top surface of the floating gate electrode and the forming of the dielectric film are performed in-situ and within the same chamber.

13. (previously presented) The method as claimed in claim 12, wherein the annealing process is performed in a N_2 atmosphere at a temperature of $900 \sim 910^\circ C$ for 20 ~ 30 minutes.

14. (previously presented) The method as claimed in claim 12, wherein the dielectric film has an ONO structure on which a first oxide film, a nitride film and a second oxide film are sequentially stacked.

15. (previously presented) The method as claimed in claim 12, wherein the steps (d) and (e) that are performed in-situ within the same chamber and comprises:

introducing a N_2O gas flow of 100 ~ 10000 sccm at a temperature of $800 \sim 950^\circ C$ to nitrify the top of the floating gate electrode;

introducing N_2O gas and DCS (SiH_2Cl_2) gas at a pressure of 0.1 ~ 3 torr and at a temperature of $790 \sim 830^\circ C$ to form a first oxide film on the entire structure including the floating gate;

introducing DCS gas and NH_3 gas at a pressure of 0.1 ~ 3 torr and at a temperature of $650 \sim 800^\circ C$ to form a nitride film on the first oxide film; and

introducing N_2O gas and DCS (SiH_2Cl_2) gas at a pressure of 0.1 ~ 3 torr and at a temperature of $790 \sim 830^\circ C$ to form a second oxide film on the nitride film.

16. (previously presented) The method as claimed in claim 15, wherein the ratio of DCS (SiH_2Cl_2) gas and N_2O gas is in the range of 1:5 ~ 1:10.